Minutes from the Alaska Scientific Review Group Meeting
NMFS Alaska Fisheries Science Center, Seattle, WA
1-3 March 2021

This report summarizes the 2021 meeting of the Alaska Scientific Review Group (AK SRG), held virtually from 1 to 3 March 2021. This document is intended to summarize the main points of discussion and does not attempt to record everything that was said during the meeting.

Attendees

AK SRG members: Beth Concepcion, Eric Regehr, Greg O'Corry-Crowe (AK SRG Co-Chair), John Citta, Kate Stafford, Lorrie Rea, Megan Williams (AK SRG Co-Chair), Mike Miller, Thomas Doniol-Valcroze

NMFS:

- *Alaska Fisheries Science Center (AFSC)*: Alex Zerbini, Brian Fadely, Burlyn Birkemeier, Brian Brost, Devin Johnson, Diana Haring, Erin Richmond, LTJG James Freed, James Thorson, Jay Ver Hoef, Jeff Harris, Jeremy Sterling, Jessica Crance, John Bengtson, John Jansen, Josh London, Katie Luxa, Katie Sweeney, Kim Goetz, Kim Shelden, Manuel Castellote, Marcia Muto, Megan Ferguson, Mike Cameron, Molly McCormley, Nancy Friday, Nancy Young, Paul Conn, Paul Wade, Peter Boveng, Peter Mahoney, Robert Foy, Robyn Angliss, Rod Towell, Rolf Ream, Shawn Dahle, Sharon Melin, Tonya Zeppelin, Tom Gelatt
- *Alaska Regional Office (AKRO)*: Jon Kurland, Julie Scheurer, Kim Raum-Suryan, Kathleen Leonard, Mike Williams, Suzie Teerlink
- *Northwest Fisheries Science Center*: Kim Parsons
- *Office of Protected Resources (OPR)*: Amy Scholik-Schlomer, Eric Patterson, Jackie Taylor, Kristy Long, Laura Ingulsrud, Lisa Lierheimer, Shannon Bettridge
- *Office of Science and Technology (OST)*: Patrick Lynch, Zac Schakner
- *Southwest Fisheries Science Center*: Aimee Lang

Fish and Wildlife Service (USFWS): Ashley Stilson, Charles Hamilton, David Caldwell, David Gustine, Jenipher Cate, Patrick Lemons

Marine Mammal Commission (MMC): Dee Allen, Dennis Heinemann, Lauri Leach, Merra Howe, Sam Simmons, Vicki Cornish

North Slope Borough (NSB)
Nicole Kanayurak

Aleut Community of St. Paul Island
Lauren Divine

General Topics

Welcome and introductions

Megan Williams, AK SRG Co-Chair, called the AK SRG meeting to order and initiated a round robin of introductions from all meeting attendees. John Bengtson then welcomed the AK SRG and all attendees. The AK SRG adopted the agenda and Marcia Muto reviewed the virtual meeting protocols, the AK SRG VLab website, and the documents posted online.

Minutes from previous Alaska SRG meeting

Williams asked if there was any opposition to accepting the 2020 AK SRG meeting minutes. There were no further comments and the minutes were considered final.

2020 Alaska SRG Meeting Recommendations

Williams provided a review of the AK SRG's recommendations from their 2020 meeting and NMFS' responses, which are available online at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/scientific-review-groups#alaska-scientific-review-group

1. The AK SRG had recommended that NMFS update them on the status of analyses to estimate abundance for Alaska ice seals, especially ringed and bearded seals, and NMFS had offered a presentation and discussion of these issues at the 2021 meeting. The SRG commented on ice seal subsistence hunting and was pleased that NMFS included new methodology and data in the SARs.
2. The AK SRG had asked NMFS to investigate how to work with the Ice Seal Committee (ISC) to update data and estimates. NMFS had responded that NMFS and the ISC recognize the importance of collecting the data but that stable funding was not available to guarantee updates every 3-4 years; however, NMFS would try to provide updates as funding allows. Williams asked who the funding is specific to. Jon Kurland responded that NMFS has provided co-management funding over the years under Marine Mammal Protection Act (MMPA) section 119 to the ISC. Kurland mentioned that the Alaska Department of Fish and Game (ADF&G) has also sought funding from NMFS through Endangered Species Act (ESA) section 6 grants, and he pointed out that neither the ISC nor ADF&G has the resources on their own, so they rely on funding from NMFS. The SRG had no additional comments.
3. The AK SRG had asked several questions regarding Cook Inlet beluga whale updates, and NMFS had provided a detailed response. Thomas Doniol-Valcroze commented on the use of the Jacobsen et al. (2020) model versus the Wade et al. (2019) model in the SAR and wanted to know more about the key differences between the two models. Greg O'Corry-Crowe asked which abundance estimate from the two different analyses should be accepted, and how it should be acknowledged that this is an ongoing issue being investigated. John Citta mentioned that the Cook Inlet beluga whale SAR will be reviewed this year and stated that he was not sure if using the mean or median would be the best way to estimate abundance. Further discussion was deferred to the Cook Inlet beluga whale SAR review.
4. The AK SRG had expressed concerns over the lack of reporting from subsistence hunts of Eastern Bering Sea beluga whales, noting that hunts currently exceed the potential biological removal (PBR) level and are also likely under-reported, and had requested that NMFS monitor the stock closely and work with the Alaska Beluga Whale Committee (ABWC) to support the collection of consistent harvest information and data needed to estimate the proportion of struck and lost beluga whales. NMFS had responded expressing similar concerns and noted that they do work with the ABWC, which does collect that information, and that NMFS is confident that there is not as much under-reporting as the SRG believes and that struck and lost data will be reported in the final 2020 beluga whale SARs. Williams appreciated NMFS' willingness to report the information and stated that this subject will require constant, close monitoring. Citta asked if NMFS let the ABWC know that they wanted better struck and lost data and Kurland reported that the ABWC has been actively communicating this to hunters in co-management meetings and that NMFS has communicated the importance of collecting struck and lost data to the co-management groups.
5. The AK SRG had recommend that the AFSC Marine Mammal Laboratory (MML) work with the observer program to develop protocols within the electronic monitoring (EM) framework to ensure that marine mammal interaction data collection continues to be a component of the observer program, and if marine mammal interaction data cannot be collected via EM, the AK SRG requested that they be updated on how mortality and serious injury (M/SI) estimates are being adjusted as more vessels transition to EM. Williams noted that the use of EM is expanding and that this will need to be monitored constantly to ensure

data integrity is being maintained. The SRG expressed concerns about marine mammal interactions happening away from the boat where EM is unable to monitor.

6. The AK SRG had recommended that NMFS prioritize the Pacific Marine Assessment Program for Protected Species (PacMAPPS) survey. The SRG stated that they look forward to seeing some of the new data that NMFS has reported being synthesized in new ways.
7. The AK SRG had recommended increased consistency in the Habitat Concerns section of the SARs, and NMFS had responded by saying they will bring this up in the next internal discussion on revisions to the Guidelines for Assessing Marine Mammal Stocks (GAMMS) to make it more consistent. The SRG appreciated the changes in some of the draft 2021 SARs in response to their recommendation.
8. The AK SRG had requested that SAR authors specify the portion of the range for which N_{MIN} is estimated. NMFS added this language to the draft 2021 SARs, which the SRG appreciated. Williams added that it would be more informative to provide the percentage of the range for which N_{MIN} is calculated.
9. The AK SRG had recommended that SAR authors explicitly acknowledge the transboundary nature of stocks, and clarify whether total mortality in a given SAR is compared to total abundance or whether PBR has been apportioned in some way. NMFS had agreed to work to include this information consistently in the final 2020 SARs and in future SAR revisions. Williams acknowledged that it will be an ongoing process to include this information in the SARs but said it would be good to know if the PBR is being apportioned for a small portion of the stock.
10. The AK SRG's last recommendation was on the Southeast Alaska (SEAK) harbor porpoise SAR, which Williams acknowledged would be discussed later in the meeting, but she wanted to highlight that this issue had come up before. She stated that the SRG supports NMFS funding an observer program and that the SRG understands there have been a lot of new analyses that will be discussed at the meeting. Williams mentioned that this is another case where M/SI may be exceeding PBR and that the SRG will need to think of a creative recommendation for observing the state fishery.

Williams then summarized the discussion from the 2020 AK SRG meeting regarding the new policy for negligible impact determinations under MMPA section 101(a)(5)(E), which allows NMFS to authorize takes of species listed under the Endangered Species Act. She stated that NMFS also finalized a policy for identifying demographically independent populations (DIPs) and designating stocks under the MMPA, which could have implications for certain stocks.

Williams then brought up the gray whale and ice seal unusual mortality events and noted that the SRG would like an update on the analysis of environmental conditions, which was brought up during last year's meeting.

NMFS Headquarters updates

Leadership Changes

Shannon Bettridge provided updates on the NMFS leadership changes that typically follow a new administration, beginning with the new Secretary of Commerce, who had not been confirmed at the time of the meeting. She reassured the SRG that although there are a number of political appointees in leadership roles, there are also many career employees that step up into those roles temporarily until the political appointees are approved. Bettridge mentioned the following changes:

- NMFS Assistant Administrator, Chris Oliver, stepped down; Paul Doremus, who is normally the NMFS Deputy Assistant Administrator for Operations, is acting Assistant Administrator.
- Evan Howell replaced Ned Cyr, who retired, as Director of the NMFS Office of Science and Technology.

- Donna Wieting, NMFS OPR Director, is retiring at the end of March 2021; OPR Deputy Director Catherine Marzin will be acting until a permanent replacement is found.
- Kelly Denit is the new director of the Office of Sustainable Fisheries.

Bettridge said she would pass along updates regarding appointees to the SRG and wanted to reassure the SRG that even though there are a lot of changes in leadership roles, NMFS has many experienced and capable employees that know the organization well and are well equipped to keep operations at Headquarters moving.

SRG Terms of Reference

Zac Schakner shared with the SRG that the SRG Terms of Reference are currently undergoing revisions and are in final clearance with NMFS leadership. The Terms of Reference are reviewed every 5 years. There were only a few changes proposed for the SRG process, including a proposed extension of the SRG member tenure along with a biennial review process, but this was dependent on final leadership approval Additionally, a deadline for the SRGs to submit their recommendations to NMFS, to allow NMFS time to incorporate changes into the SARs was a proposed revision. All edits were previously presented to all three SRGs, which provided good feedback. Finally, he mentioned that there were five members of the AK SRG up for review in the last review cycle, all of whom were reappointed. There were no new nominations in that cycle, so NMFS is looking into how to broaden interest in the SRG to get more nominees in the future.

Deterrents Proposed Rule

Kristy Long and Amy Scholik-Schlomer (NMFS OPR) provided an overview of NMFS' proposed rule for marine mammal non-lethal deterrence. Long summarized the MMPA's exemption to the take prohibition for deterring marine mammals from causing damage to fishing gear, catch, or property or endangerment to personal safety, as long as the deterrence does not result in M/SI of the marine mammal. Currently this MMPA provision has not been implemented, and NMFS must publish guidelines on how to safely deter marine mammals listed under both the MMPA and ESA. This would give NMFS the authority to prohibit certain forms of deterrence, after giving notice to the public, if they are determined to have significant adverse effects on marine mammals. If the guidelines are followed and there is M/SI, the user would be protected from liability for that take. Long highlighted that NMFS did not consider the effectiveness of the deterrents because the statute requires us to evaluate the impacts on the animals, not to mention that NMFS does not have the resources to evaluate effectiveness for every deterrent on every species. NMFS evaluated the impact of deterrents on marine mammals in general for day-to-day use, as compared to deterring marine mammals in potentially harmful situations such as an oil spill, in which case, NMFS would be willing to authorize more risky deterrents under a different MMPA provision. These guidelines would also have no impact on Alaska Native takes of marine mammals for subsistence purposes. Long then explained that NMFS has evaluated over 200 individual deterrents in 10 different categories. She briefly reviewed some of the different categories, such as acoustic deterrents and non-acoustic deterrents (visual, physical barriers, chemo-sensory, and tactile methods such as projectiles and manual, electrical, and water deterrents). She mentioned that some deterrents may be included in the guidelines, specific measures, or prohibitions and many have implementation provisions.

Scholik-Schlomer then explained that NMFS has evaluated over 120 acoustic deterrent devices (most of which are in-water) to determine the potential to cause acoustic impacts, particularly a permanent threshold shift, which is when the animal's hearing does not fully return to the baseline after exposure to the sound and/or non-auditory (lung, GI tract) injury for underwater explosives. She went on to explain the criteria for evaluating the devices (decibel source level, frequency, duty cycle) and the conservative approach of basing the evaluation on the smallest calf or pup for underwater explosives. Long then summarized how non-acoustic deterrents were evaluated, which

relied on NMFS' existing policy for determining the severity of an injury. In cases where injury information was lacking for certain taxa, other animals, including humans, were used as a proxy.

Long reviewed the proposed guidelines for various types of explosive impulsive, non-explosive impulsive, and non-impulsive acoustic deterrents. When visibility is less than 100 m (e.g., at night or in poor weather conditions) using certain explosive deterrents would be prohibited. She continued by saying that when multiple pinniped taxa are present, the user would respect the most sensitive taxa's minimum distances and silent intervals.

Scholik-Schlomer then went on to explain the deterrent web tool and how users can enter the specifications of underwater non-impulsive deterrent devices with a source level >170 dB and the tool will tell you if the device meets the evaluation criteria for all marine mammal hearing groups. If devices meet the criteria, a certificate valid for 1 year can be generated for that device that can then be checked by law enforcement for compliance.

Long then brought up the proposed prohibited deterrents for pinnipeds, which include vessels used to chase away animals, chemo-sensory deterrents, tactile sharp objects, and the use of firearms other than for deploying bird bombs or cracker shells.

Long mentioned there were over 330 public comments received on the proposed rule. NMFS is in the process of analyzing and summarizing the comments and then will update the Environmental Assessment (EA) and write the final rule, which they hope to have out by the end of 2021.

Mike Miller summarized the discussions currently happening in Sitka, AK, where aquaculture/mariculture with seaweed farming is increasing. These operations have the potential of interacting with both NMFS- and USFWS-managed marine mammal species. He asked if NMFS and USFWS have discussed how they will work together on this and if there will be a consistent message from both agencies. Long responded that this rulemaking is restricted to marine mammals under NMFS' jurisdiction, and that the USFWS has some guidance for polar bears but nothing for other species, so coordination would need to happen on a project-by-project basis. Miller noted that the USFWS has expressed interest in developing similar guidelines and that they are seeing a lot of pre-applications for farming. Long responded that NMFS can provide guidance on the pre-applications, but those typically take a lot of time as the projects are constantly changing. Miller acknowledged this and mentioned they are considering putting observers in the farming areas to monitor for marine mammal interactions, to which Long replied that NMFS would be interested in anything they learn from those observations.

Williams then asked to what extent NMFS is considering impacts to other (non-marine mammal) species. Long replied that the EA focuses on impacts to marine mammals but that NMFS will undertake ESA section 7 consultations to consider impacts of the rule on ESA-listed species, including non-marine mammals. Scholik-Schlomer mentioned that for acoustic deterrents, they did look at other species like fish, but found that marine mammal acoustic thresholds were more protective. Long followed up by saying NMFS did receive a handful of comments from industry groups, commercial and recreational fishing groups, as well as ADF&G regarding concerns about marine debris from foam projectiles or sponge grenades, as well as cross-referencing Unmanned Aircraft Systems (UAS) requirements in Alaska and elsewhere, which was very helpful.

<u>Humpback whale stock structure updates</u>

Eric Patterson gave an overview of plans for the upcoming joint Alaska-Pacific SRG intersessional meeting on humpback whale stock structure. Following NMFS' revision to the ESA listing for humpback whales in 2016, NMFS has not revised the MMPA stock structure. There are currently

three MMPA stocks in the North Pacific (Western North Pacific, Central North Pacific, and CA/OR/WA) and four ESA distinct population segments (DPSs) (Western North Pacific – endangered, Hawaii – not listed, Mexico – threatened, Central America – endangered). The joint SRG meeting will include discussion of background information, the MMPA, the GAMMS, and NMFS' new MMPA stock policy and then it will focus on four draft Tech Memos that identify demographically independent populations (DIPs) within the DPSs.

Doniol-Valcroze pointed out that the AK SRG was not asked to review the humpback whale SARs this year and asked when the SRG can expect to see the proposed changes in the SARs. Patterson responded that NMFS hopes that what is presented in the Tech Memos will inform revised stock structure that would be rolled into the draft 2022 SARs but noted that this is contingent on going through the process described in the stock policy, which may not be the same for all stocks. Doniol-Valcroze then asked how this information will integrate with the SPLASH 2 (Structure of Populations, Levels of Abundance and Status of Humpback Whales) project and how new abundance estimates for these stocks or DIPs will be produced. Patterson replied that there will be some discussion about that at the joint SRG intersessional meeting, but that these data are forthcoming or waiting for reanalysis. He mentioned there could be new stocks that will be further informed as SPLASH 2 continues and that will also be part of the conversation.

NID Policy and 101(a)(5)(E) updates

Patterson reminded the SRG that Bettridge talked about the negligible impact determination (NID) policy and how it relates to MMPA section 101(a)(5)(E) during the 2020 AK SRG meeting. He provided some background on the subject, stating that to authorize take of ESA-listed marine mammals, NMFS must make certain findings. First, NMFS must determine that the incidental M/SI from the commercial fishery would have a negligible impact on the affected stock or species. The other two required findings are that the stock must have a recovery plan developed or in the process of being developed, and where required by section 118, a monitoring plan is developed, vessels must be registered, and have a take reduction plan in place or one in development for the species or stock. Patterson mentioned that during last year's meeting, this policy was open for public comment but NMFS has since addressed the public comments, finalized the policy as of June 22, 2020, and both the comment responses and the policy can be found online. He stated that in October 2020, NMFS published proposed authorizations for several fisheries for which NMFS was able to make the three findings, which would mark the first national and Alaska region implementation of the policy. The three fisheries in Alaska where the necessary findings were made include the Bering Sea/Aleutian Islands (BSAI) flatfish trawl, BSAI pollock trawl, and Gulf of Alaska sablefish longline fisheries. The public comment period on those authorizations opened in October 2020 and NMFS is currently working to address the public comments and finalize the authorizations. The Federal Register notices and a supplemental worksheet for each fishery are available on the AK SRG VLab website.

Williams asked what this will mean for the specific fisheries that have been authorized. Patterson replied that the authorizations provide take coverage under the MMPA for ESA-listed marine mammal species; however, rather than authorize certain numbers of takes, they authorize takes of ESA-listed marine mammals through operations of the fishery. Williams then asked whether this has any impact on how M/SI is calculated or tabulated, and Patterson confirmed that it does not impact M/SI. Robyn Angliss asked how commercial aquaculture fisheries are addressed through section 101(a)(5)(E) authorizations. Long acknowledged that is a complicated subject since it depends on whether aquaculture is considered a fishery. Long drew on a recent court decision that said aquaculture is not a fishery under the Magnuson-Stevens Act in the Gulf of Mexico. She followed up by saying NMFS is still deciding how to apply that court decision, but currently MMPA section 118 provides authorizations for takes that happen in aquaculture operations and that M/SI

of marine mammals needs to be reported. Changes to aquaculture operations on the MMPA List of Fisheries (LOF) are currently on hold.

Nicole Kanayurak then asked if the Alaska fishery authorizations were only for the ESA-listed species outlined in the Federal Register notices or if bowhead whales would also be impacted. Patterson replied that the list of species in the Federal Register notices are only the ESA-listed species for which take would be authorized under the MMPA, as these are the only ESA-listed species that NMFS anticipates those fisheries would have incidental M/SI. He finished by saying if bowhead whales were not included, it is not anticipated that this species would be incidentally killed or seriously injured in the fishery.

Eric Regehr asked how much thought was put into the possibility that capacity for growth would be compromised when the negligible impact thresholds were developed. He then related his question to some polar bear subpopulations where the estimated growth rate is below R_{MAX}, the populations are most susceptible to human removals, and the negligible impact thresholds rely on PBR calculations that include R_{MAX}. Patterson replied that in some cases the PBR framework is violated and does not work particularly well, so for those stocks, NMFS may want to consider other avenues to conduct the negligible impact analysis. He continued by saying that while the thresholds rely on the PBR framework, they are quite low because the most conservative approach, for endangered species, was applied to all stocks.

Williams asked about the review time for NIDs, because if fisheries are expanding into the northern Bering Sea, there are likely to be different interactions. Patterson replied that MMPA 101(a)(5)(E) authorizations stem from the LOF, so if a fishery expands geographically and kills or injures different marine mammal species as a result, it would first be reflected in the LOF, and then NMFS would conduct a NID analysis based on that. He also noted that MMPA 101(a)(5)(E) permits are issued for 3 years, but NMFS can pull them at any time if warranted. Teerlink then commented that, although she is new to the process, the way it has been streamlined and improved makes it a lot easier to redo the analyses as new information becomes available, and it is more accommodating to changes compared to the previous process.

<u>Serious Injury Policy updates with focus on Random Forest model for large whale proration</u>
Lisa Lierheimer reviewed the NMFS Serious Injury Policy, the history of its development and review process, its objectives, and the current effort to review and revise the policy. Lierheimer outlined the next steps, including to wrap up draft revisions, have an internal review, and then consult with the Marine Mammal Commission and SRGs. Once that is completed, NMFS will get input from take reduction teams and then publish the draft policy for public comment, before finalizing and implementing the updated policy.

Jim Carretta then reviewed the status of the ongoing large whale serious injury policy discussion within NOAA. He provided an overview of the current policy and how NMFS is exploring ways to use machine learning / decision trees to improve and assist with the injury determination process. He noted that current serious injury guidelines essentially use a decision tree process applied manually by Science Centers and noted the NMFS 2008 Serious Injury Workshop report contains language recommending a decision tree framework be used in assessing injuries. Carretta presented random forest model results derived from known-outcome entanglement and vessel strike cases for right and humpback whales. Models were used to predict the health status (Dead/Health Decline vs. Recovery) of known-outcome cases 1 year post-entanglement or post-vessel strike. Covariates included words and phrases from injury narratives (e.g. “severe” vs “superficial”) that were coded as presence / absence variables for each case. Predictive accuracy was in the range of 85% - 95%, depending upon the species and injury type. Accuracy rates were

much higher than expected by chance, suggesting that identified covariates had high predictive value. Models yield both probabilistic and binary predictions of health status. Carretta then compared the model-predicted and assigned health status of large whale injuries for *unknown outcome* cases where Science Center personnel have previously used existing injury protocols and found that the number of entanglement serious injuries was similar between the two applications. In his example, the model determined 21 right whale deaths / serious injuries and there were 22.75 human-determined right whale deaths / serious injuries. Results were similar for humpback whale entanglements (145 model-determined deaths / serious injuries and 155 human-determined deaths / serious injuries.) For vessel strikes there were greater differences between the two methods, e, which Carretta attributed to relatively small vessel strike sample sizes compared to entanglements. He then summarized the advantages, drawbacks, and limitations of this new approach in which he noted that the assessment would be an algorithm so there is less manual labor involved and the data can have a continuous distribution of proration factors instead of hard cutoffs. The limitation of this approach, however, is that it requires known outcomes, so it could not be applied to animals that are hard to track over long time periods such as pinnipeds and small cetaceans. Carretta expressed a positive outlook for this approach and said the model would constantly be improved with new data for animals that can be tracked for multiple seasons, in which case the narrative will simply be updated.

Doniol-Valcroze liked the new approach and asked about the threshold for determining whether an injury is serious or non-serious. Carretta mentioned this has come up in the working group and they decided to use binary assignment but then decided they should use a probabilistic assignment where, for example, if the model indicates a 28% probability of serious injury, that should count as a 0.28 take against PBR. Doniol-Valcroze and O'Corry-Crowe agreed with this reasoning, but O'Corry-Crowe was curious if machine learning would be able to weigh the value of human intervention. Carretta replied that they excluded intervention cases for creating models, but that estimating the probability of a 'Recovery' for an intervention case using narratives both pre- and post-intervention would yield a difference in recovery probabilities that can be quantified. Regehr then asked about the pros and cons of this approach compared to a logistic regression type framework. Carretta replied that a logistic regression could work but the random forest model is easy to implement and update, provides direct measures of variable importance, and it is easy to get an idea of the uncertainty in the model, so he felt confident using it. Doniol-Valcroze asked when this would be implemented. Carretta replied that he is not sure as he wanted to get feedback from the SRGs before submitting it to the Southwest Fisheries Science Center. A roll-out would include using the model and human determinations side-by-side to compare results and ease the transition from the current method. He also indicated that some human judgement and oversight will be needed for specific cases, such as when assigning an injury to a dependent calf when the mother, but not the calf, is seriously injured, which would be easy to code into the model. Doniol-Valcroze commented that if this is implemented in the SARs, the method used to produce the estimates would need to be clarified in the SAR. Carretta replied that the method would only be applied to large whales, and the long-term goal is to have an application with a user interface that produces serious injury probabilities from the narrative data that is entered. Doniol-Valcroze asked if this will increase or decrease M/SI on average compared to human determinations. Carretta pointed out that the results for entanglements were nearly the same with both methods, but it is difficult to assess since the model is built with much more data than the current SI policy uses. Jay Ver Hoef then responded to Regehr's question about using a random forest model versus a logistic regression model by pointing out differences in how the models function and the benefits of the random forest model, which Carretta expanded on.

NMFS Alaska Regional Office updates

Kurland presented updates on a variety of NMFS Alaska Regional Office topics, some of which were underway last year and discussed with the SRG then, and are still ongoing. He began by providing an update on critical habitat designations for ringed and bearded seals, explaining the legal issues that surrounded those designations and a settlement agreement to complete the final designations by March 2022. He explained how critical habitat is determined, including the process for considering exclusions based on economic and national security impacts, and some limitations, such as being restricted to U.S. jurisdiction.

Williams asked if excluding areas for the military was a common practice or if this was a special circumstance. Kurland replied that considering such exclusions is a standard part of the critical habitat designation process, but whether to provide an exclusion is a fact-specific determination. Citta then asked how the southern extent of the area was determined and why it is smaller than the original proposed designation; Kurland replied that it was a result of using more recent ice data, which resulted in moving the southern ice edge north.

Kurland continued with the humpback whale critical habitat designation, which stemmed from the 2016 ESA reclassification of humpback whales from one global population to14 DPSs, which then required critical habitat designations for the three listed populations in U.S. waters. He mentioned that nothing has changed since he presented this topic at the 2020 SRG meeting, other than the timeline for producing the final designation based on a revised court-ordered deadline of April 15, 2021. The rule is currently under review. He then went on to provide a summary of three recently initiated 5-year reviews being conducted under ESA section 4. Kurland stated that MML is making progress on the Cook Inlet beluga whale review, which will likely be the first review completed, followed by reviews of ringed seals and bearded seals. Once reviews are complete, they will be reflected in future SARs. Next he provided a brief overview on the status of evaluating whether to list Iliamna Lake harbor seals under the ESA and whether the population should be considered a stock under the MMPA. In response to a petition to list the seals as a DPS under the ESA, NMFS prepared a DPS Report in 2016, concluding that this is a discrete population but it is not ecologically significant to the broader taxon, so it is not a listable entity. NMFS received a second petition to list the seals as a DPS in February 2020; the agency has not yet issued the "90-day finding" as to whether the petition presents substantial information indicating that listing may be warranted, but Kurland said he expects NMFS will move forward on this action soon and so updates are expected. Following that decision, NMFS will revisit whether to revise the harbor seal stock designations. The last update Kurland shared was regarding apportioning takes between the western and eastern Steller sea lion stocks in places where the two stocks have some overlap. He did not go into much detail given there will be a presentation on this subject later in this meeting.

O'Corry-Crowe asked if there are any discussions happening about the critical habitat that exists outside of U.S. jurisdiction and stated that the excluded military zones might become more critical as time goes on. Kurland replied that NMFS cannot designate critical habitat under the ESA outside of waters under U.S. jurisdiction, but NMFS can update designations over time, particularly if there is updated information on habitat use or features. O'Corry-Crowe followed up by asking why NMFS weighs in on the review of species that have global distributions if they do not have jurisdiction outside of the U.S., to which Kurland replied that the 5-year review process under the ESA is focused on the listing status and not critical habitat. NMFS can list a species anywhere, but can only designate critical habitat in waters under U.S. jurisdiction.

NMFS Marine Mammal Laboratory (MML) updates

MML overview

Bengtson welcomed the SRG and provided an updated overview on MML operations for fiscal year 2021. In terms of leadership changes, he noted that Robyn Angliss has moved from Deputy Director

to MML's Cetacean Assessment and Ecology Program (CAEP) leader and that Nancy Friday moved from acting CAEP leader to Deputy Director. He mentioned that MML's California Current Ecosystems Program (CCEP) leader, Bob DeLong, has retired and Sharon Melin is the acting leader for that program. Bengtson then gave an overview of planned projects for 2021 and detailed how the AFSC prioritizes surveys and allocates funds to those projects based on the priority of information needed. He presented a list of the projects that MML thought were likely to be funded with base monies (i.e., excluding temporary or outside sources of funding) but noted that funding had been declining in recent years, so funding all the work with fewer resources becomes challenging. Bengtson noted that due to the Covid-19 pandemic, almost all fieldwork was cancelled in 2020, and MML would need to figure out what fieldwork will be approved and can be funded in 2021. He then stated that MML is optimistic about fieldwork happening in the upcoming year and he highlighted several planned projects.

Plans for PacMAPPS and ArMAPPS

Angliss provided a detailed overview of the purpose and some of the information that is produced from the Pacific and Arctic Marine Assessment Program for Protected Species (PacMAPPS and ArMAPPS) surveys. She provided background on how MML determined the need for certain types of marine mammal information and the importance of the data. She mentioned that beyond NMFS, the data collected is also used by various users, partners, and constituents. Angliss pointed out the information needs for Arctic cetacean species and the lack of recent surveys. She then described how PacMAPPS and ArMAPPS surveys will be partial solutions as a large-scale, multi-agency mission that will provide invaluable opportunities to collect the data that are needed to help inform stakeholders on the current status for a variety of Arctic species. She described the plan to have the surveys conducted on a rotational basis and the desired length of the surveys that would be needed to provide accurate abundance estimates for the various target species.

Kanayurak asked Angliss what the other portion of the solution will be for providing abundance estimates for Arctic marine mammals. She also pointed out the next Arctic survey is scheduled for 2025 but there are some projects listed in 2021, so she was curious to hear a brief update on those projects. Angliss provided an outline of a proposed survey schedule detailing the projects, locations, and the information needs that the projects serve. She noted that projects planned for 2021 are mostly data processing; however, the acoustic project does have a budget for some fieldwork to deploy and recover instruments in addition to some data processing. Bengtson then noted that, unfortunately, the list of projects is aspirational but not guaranteed. Some projects are very important for stakeholders and managers, so they are prioritized, but he is hopeful that MML will be granted NOAA ship time, considered "free" ship time, which makes funding the large-scale projects much easier. Regehr had a question on project funding and asked what type of strategic planning exists to deal with issues that are likely to emerge in the future, such as climate change and the resulting changes in temporal and spatial distribution of species and threats such as the expansion of fisheries into the North Pacific. Bengtson replied that there is a lot of discussion and interest in strategic planning for the future. He noted that it is challenging to find a solution that will help pick up on the signals of a changing landscape and address priorities, such as providing updated abundance estimates; but, he is hopeful that some of the work being done, for example, Peter Boveng's Polar Ecosystems Program's work on ice seals, will accomplish this. The bottom line, however, is that abundance and trends are the highest priority, so the plan is to spread out the funding and try to collect information that will also help identify some of those clues. Williams then asked if the change in administration and the climate-based executive orders will result in more funds allocated to protected resources. Bengtson replied that there is a lot of optimism and MML hopes that support comes through, but they will continue to look for ways to be most effective. He noted that a new administration does not guarantee an increased budget, as was seen two

administrations ago when the Arctic and climate were high on the agenda, however, the MML operational budget continued to decline over the past decade.

Update on projects to synthesize different types of data

Ver Hoef provided an update on data integration for modeling at-sea densities of marine mammal stocks. He described the need for fine-scale abundance information, the various ways the data are currently being collected, how the data can be manipulated to understand the spatial distribution of species, and how those different types of data can be used to help produce abundance estimates. He touched on line-transect surveys, pinniped surveys, and mark-recapture work.

Williams asked if the SRG will hear about the type of data collection that uses close-kin mark-recapture (CKMR) or if there are examples where this method is being applied to populations. Ver Hoef replied that there have not been many case studies using CKMR thus far, but he did list several studies involving different fish species in which the methods were applied. Paul Conn followed up by stating that there is an ongoing project with ADF&G that is trying to apply the method to bearded seals and that this is the only real application involving AFSC species so far.

Ver Hoef continued talking about biologging, the Platforms of Opportunity (POP) program data collection, and acoustic data, and he provided detailed information on how the data are being used or can be used to inform NMFS on management decisions. He presented information about the data integration working group that MML formed to assist with decisions on how to incorporate and integrate all of the different types of data. He then pointed out all the new technology that is being used, including UAS, satellite imagery, and environmental DNA (eDNA), and the challenges that are currently being faced with these new data sources.

Doniol-Valcroze commented that this is the way of the future and was particularly interested in how the POP data are being integrated, which he and Ver Hoef agreed to discuss offline.

Update on analyses to estimate abundance for ice-associated seals

Conn started by sharing a brief history of MML's aerial surveys of ice-associated seals, highlighting the history of the surveys, the ground-breaking technology used in the current surveys, and their future survey plans. He described the different surveys that have happened over the years, touching on key takeaways from the surveys and data collection designs and analyses. Conn presented a new data analysis and unpublished work on modeling the abundance of bearded and ringed seals in the Chukchi Sea and described the challenges in modeling detection probability for animals that haul out (bearded + ringed seals) and build dens on the ice (ringed seals). He presented some preliminary abundance results and then went on to describe current work and plans for future work.

Citta expressed his concerns about the survey design, in which for a given year, the team surveys one region and then in the following year surveys a different region when the available ice is changing year-to-year as well. He wondered if they have considered this in their survey design and if they have thought about conducting a survey over a wider area so that surveys can be more closely compared over multiple years. Conn replied that this would be challenging from a logistical perspective since the area that needs to be covered (Bering + Chukchi + Beaufort Seas) is so large and requires considerable consultation with diverse stakeholder groups, but ultimately agreed that a less intensive survey over a wider area might be better. Williams clarified that the estimates are two years out from being incorporated into the SARs and Conn replied that the analyses are currently on standby but they hope to include them within the next year.

Research update from Aleut Community of St. Paul Island

Lauren Divine, director of the Ecosystem Conservation Office, Aleut Community of St. Paul Island, provided an overview of the role of her office and how it has evolved to where it is today. She described the co-management agreement that was developed with NMFS under MMPA section 119 and the recent 2020 revision to expand the agreement. The revision was designed to help improve the exchange of information and the co-management by Native organizations and federal agencies to better conserve and manage the subsistence use of marine mammals, specifically northern fur seals, Steller sea lions, and harbor seals. Divine described activities occurring on St. Paul Island, including sampling efforts during harvests to collect data to share with other researchers or archive for future use, highlighting the number of opportunities that are available for co-managers to collaborate. She then discussed new activities, including a VHF tagging study looking at the influence of disturbance from human activities. Divine then touched on the ongoing marine debris removal effort and then wrapped up her presentation by noting that her group represents only one of over a dozen other organizations that have co-management agreements. She stated that they are constantly working on promoting open communications between the various co-managers and the Agency, with the goal of conserving marine mammal populations by sharing information.

Williams expressed her appreciation for the overview and highlighted the importance of these co-management agreements. Divine explained how her group, the Ice Seal Committee (ISC), and other Alaska Native Organizations (ANOs) look for opportunities to collaborate, help increase capacity of research, and leverage funding opportunities.

Southeast Alaska harbor porpoise - updates on genetic analysis, stock structure, abundance, plans for 2022 SAR, and plans for Southeast Alaska drift gillnet fisheries observer program
Kim Parsons provided the SRG with updates on the Southeast Alaska (SEAK) harbor porpoise stock. She noted that MML has been conducting harbor porpoise sighting surveys in the waters of SEAK for several decades and, beginning in the early 1990s, there were contrasting abundance trends in different regions of SEAK, indicating that multiple populations could be present. Parsons mentioned that in 2016 a pilot study was initiated to determine if eDNA from harbor porpoise fluke prints could be used as a supplement for tissue samples in target areas where data have been lacking. The results were published in 2018 and 78 eDNA samples were collected and analyzed. Parsons explained how the samples were analyzed and stated that the results showed weak evidence of genetic isolation based on geographic distance, which means the farther away animals were from one another did not necessarily relate to how genetically different they were, which was not unexpected applying a Bayesian population structure model (Structure) to broad geographic areas represented by small sample sizes. They found that they were able to differentiate levels of relatedness between harbor porpoise using nuclear single nucleotide polymorphism (SNP) data, which allowed them to confidently differentiate between unrelated harbor porpoise and first-order relatedness, such as the parent-offspring pairs. When looking at the pairwise relatedness for harbor porpoise within *priority* regions, Parsons stated that genetic relatedness was significantly higher than that expected by random chance. This suggests that there is some level of geographic structuring where individuals are more related to others in a specific region and may indicate a level of natal philopatry to the different regions. Mitochondrial (control region) sequence data revealed a high degree of genetic diversity throughout AK regions without a strong phylogeographic pattern. In the inland waters of SEAK, however, harbor porpoise in the southern and northern regions of Southeast AK share several haplotypes, two of which are unique to southern SEAK. They quantified the amount of genetic differentiation between the different regions using FST and PhiST and described significant genetic structuring within SEAK, providing support for possible differentiated groups within the currently recognized Southeast Alaska harbor porpoise stock. In 2019, a small number of eDNA samples were collected in the intermediate region between the S-SEAK and N-SEAK, near Kake, AK. MtDNA haplotypes generated from eDNA samples in this region are not unique to SEAK, did not differ significantly (Fst) from harbor porpoise in the

northern region of SEAK (N-SEAK), but were significantly different from harbor porpoises in the southern region (S-SEAK) of SEAK, further supporting the putative boundary between the northern and southern regions of SEAK just south of Kake, AK. Based on the new genetic data generated using both nuclear SNPs and mitochondrial DNA (mtDNA) sequences, Parsons indicated that a stock boundary revision could be warranted for harbor porpoise in SEAK, separating the northern region from the southern region within SEAK.

Following the presentation, Regehr asked how the analyses translate to a functional demographic structure, which is critical to understanding the conservation and management status. Parsons replied that there is strong evidence to suggest significant demographic independence to keep supporting genetic differentiation, which suggests that the levels of gene flow between these areas are low enough that they are functioning as independent units. Regehr asked if this level of genetic structure is evidence of demographically separate units and if the units should be managed as such. Parsons confirmed that, based on low levels of gene flow, high evidence of female philopatry driving mtDNA divergence, as well as significantly more genetic differentiation than would be expected, it is reasonable to say that SEAK harbor porpoise are not one large panmictic population, however it is important to acknowledge the limitations of small sample sizes in many of the geographic regions represented in the analyses. Angliss added that there is a process within NMFS to use the data and the publication on genetics to examine stock structure and NMFS is currently going through that process. Miller had a question regarding the source of the eDNA, stating there have been reports of large aggregations of harbor porpoise on the outer coast of SEAK. Parsons replied that they did not get samples from outer waters or during the spring months and that the eDNA samples were all collected from inland waters and mostly during summer.

Alex Zerbini then presented new information on abundance estimates for the SEAK harbor porpoise stock. He noted that he presented preliminary results from the 2019 survey at the 2020 Alaska SRG meeting but they have since completed additional analyses that they wanted to share with the SRG. Zerbini expressed the current concern that harbor porpoise M/SI might be unsustainable in some regions, highlighting that the previous abundance estimates for the entire range and for the inland waters are out of date. He displayed a map of the SEAK survey area and indicated the survey areas where data have been lacking. Zerbini pointed out the challenge of trying to capture an accurate representation of the entire area without surveying each inlet in the inland waters of SEAK. He described the survey design process for selecting 13 of the 166 inlets, in order to get a sufficient representation of the wide geographic area. Zerbini then explained how they improved the efficiency of tracklines and how abundance was estimated for the genetically differentiated harbor porpoise in the northern and southern geographic areas, consistent with Parsons' presentation. He noted that they also estimated abundance for ADF&G fisheries districts 6, 7, and 8, where bycatch was monitored in 2012 and 2013; these districts are primarily in the southern region of the inland waters of SEAK. Zerbini described how they computed the density in each region, highlighting that they tried to address the probability of detection (g(0)) that previous surveys in SEAK had not addressed. He explained that the problem was in determining the number of harbor porpoise missed on the tracklines because the species is small, fast moving, and occur in small groups. G(0) is typically estimated using independent observers in two survey platforms, but that was not feasible during the 2019 survey. By computing ocean-condition-specific estimates of porpoise density, however, they were able to get relative g(0) values for different Beaufort states. With 80% of the proposed transect lines surveyed, the analysis indicated three main concentrations of harbor porpoise in Glacier Bay/Icy Strait/Cross Sound, Frederick Sound/Kake, and Wrangell/Zarembo Islands. High densities of harbor porpoise have consistently been observed in these areas for the last 20-30 years, however, during the 2019 cruise, harbor porpoise were only occasionally detected in the inlets in the northern SEAK region and were never detected in the inlets in the southern region. Their analysis estimated 1,619 individuals in the northern SEAK

region, 890 individuals in the southern region, and 670 individuals in ADF&G districts 6, 7, and 8. Zerbini highlighted the concern that salmon drift gillnet fisheries operate in six ADF&G management districts; however, in 2012-2013, only 6.5% of the state-managed fishery was observed in ADF&G districts 6, 7, and 8, resulting in an estimated M/SI of 12 harbor porpoise per year in those districts. He pointed out that PBR is less than the current estimate of M/SI in the southern region of the inland waters of SEAK as well as in the area that overlaps ADF&G districts 6, 7 and 8, which suggests the bycatch could be unsustainable if harbor porpoise in the northern and southern regions are in fact separate populations. Zerbini concluded his presentation by pointing out that harbor porpoise in the inlets represent only 5% of the estimated abundance of harbor porpoise in all of the inland waters of SEAK. He noted that the survey was conducted only in the inland waters of SEAK and that they need a better understanding of the relationship between harbor porpoise in coastal and inland waters and an estimate of the abundance of harbor porpoise in coastal waters.

Jennifer Ferdinand then detailed the AFSC's progress on establishing a marine mammal observer program in AK state fisheries. She pointed out that, currently, there is no observer program or fishery-dependent data collection for harbor porpoise fishery interactions in SEAK and that the salmon drift gillnet fishery in the inland waters of SEAK is state-managed. There are no resources currently allocated to this type of observer program because fishery-dependent data collection in Alaska is funded by the fishing industry, which is federally based, so the AFSC is trying to find other funding sources. She outlined their 4-year timeline for initiating the observer program: the first two years will focus on scoping and troubleshooting, using a low sampling effort to ensure the program can be scaled into a rigorous program, and then the field seasons in year 3 and 4 will have observer coverage rates that are based on the scoping phase (similar to the way NMFS samples in partial coverage federal groundfish fisheries in Alaska). They will also incorporate any tools and information discovered during the scoping phase, such as the work being done by Zerbini. The research completed during the scoping phase would be focused on the technology to collect the data, effective methods for deploying observers, and to determine if alternative platforms for collecting data would be needed. Ferdinand highlighted the issues of inconsistency in past marine mammal observer programs but pointed out that she expects a lot of progress in 2021 and that NMFS plans to have the AFSC administer the program to align it more closely with other established observer programs to make it more efficient and consistent. She said they have identified potential funding sources but will continue working on securing funding this year.

O'Corry-Crowe asked about the demarcation line separating the northern and southern regions in the inland waters of SEAK that came up during Parsons' and Zerbini's presentations. He acknowledged the high population densities in the northern and southern regions but he also pointed out there is a somewhat high population density in the area where the line is depicted on the map. Parsons explained that is what they were seeing but, when comparing genetic samples of this central area to the northern and southern regions, they found that the centrally located harbor porpoise were more closely related to harbor porpoise in the north than to harbor porpoise in the south. O'Corry-Crowe then asked about sample size and clustering of animals and how confident they are with these results, especially with the small sample size from Yakutat. Parsons acknowledged the concern with clustering and agreed that, given the small sample size of animals from Yakutat, they must be very cautious about what they can conclude. O'Corry-Crowe also expressed concerns over the eDNA collection and how confident you can be that you are not collecting eDNA from the same animals as in past years. Parsons concurred and mentioned that they will be addressing that shortfall of eDNA, since it is not possible to tell how many individuals are captured in one sample or if the same animals are being resampled. Zerbini addressed O'Corry-Crowe's concern regarding the demarcation line and pointed out that harbor porpoise generally are not known to occur in the narrow straits connecting the northern and the southern regions. Land

between these two areas can act as a geographic barrier and the line is not necessarily the exact location of the demarcation line but an indication of where it could be. O'Corry-Crowe replied that from his experience, it would be beneficial to explicitly state that information in the publication. Regehr asked Zerbini if it was possible to have two independent observers on the same vessel in order to estimate the probability of detection (g(0)). He then asked a more general question about how to study and understand the interaction between harbor porpoise on the outer coast and in inland waters. Zerbini replied that due to the small vessel size, and limited number of observers on the survey, they were unable to have two independent observers. Doniol-Valcroze noted that his group uses a similar survey design; he wondered if the 2019 surveys sampled on the way in and out of the narrow inlets. Zerbini replied that they only sampled in one direction, either in or out but not both, to avoid over-counting. He also explained in more detail how they came up with the density estimates. Doniol-Valcroze then asked if they are also using previous surveys from published literature. Zerbini replied that they are only using MML's past surveys from 1991 to 2012 to compute g(0) and explained how the data were used. Doniol-Valcroze then requested confirmation that the uncorrected abundance estimate is used in the draft 2021 SAR and Zerbini confirmed that they used the uncorrected estimate because they had not finalized the g(0) analysis when the SAR was drafted; however, it would be helpful to get the SRG's opinion on this. Williams wrapped up the question and answer session and stated that it would be a good discussion to pick up during the SEAK harbor porpoise SAR review.

ESSL / WSSL apportioning in SE Alaska - guidance, M/SI, and PBR calculations

Kim Raum-Suryan started the presentation on apportioning human-caused M/SI of Steller sea lions in the SEAK mixing zone and calculating PBR. She described the delineation line at 144°W longitude that separates the eastern and western Steller sea lion stocks, which is based on a phylogeographic method that considers genetic, morphological, population dynamics, and distributional data. She then described the SEAK mixing zone, which is based on movement data from several published sources, where adult female Steller sea lions born at western DPS rookies in the central Gulf of Alaska have given birth at the northernmost eastern DPS rookies in SEAK. She noted that pups with both western and eastern DPS haplotypes exist at the northern SEAK rookeries, which indicates that females from both DPSs are giving birth at these sites. She highlighted the importance of knowing that animals are immigrating to the mixing zone to ensure proper protections for endangered western DPS Steller sea lions and because of NMFS' obligation to use the best available information to help other federal agencies meet their obligations to consult with NMFS under section 7 of the ESA. Raum-Suryan also noted that it is important to know about the mixing in order for NMFS to provide guidance for authorized and permitted takes of western DPS Steller sea lions east of 144°W, as well as for NMFS research takes, incidental takes, and stranding response activities in this area. The guidance that NMFS follows was produced in 2013 and, since then, it has been challenging to follow this guidance because the best available science involved in tracking the amount of mixing is determined with brand-resights, which are not common in this region. A group of Alaska Department of Fish and Game (ADF&G), NMFS, and other researchers analyzed the proportion of western DPS Steller sea lions that are in this mixing region of SEAK. Based on 18 years of resight data from over 3,500 branded Steller sea lions within the eastern and western DPS regions, as well as examination of mitochondrial haplotypes from both populations, eight regions were identified in SEAK where western DPS Steller sea lions occurred (Jemison et al. 2018, Hastings et al. 2020),. Five of the eight regions had sufficient data to estimate the percentage of western DPS Steller sea lions, which allowed NMFS to produce updated guidance in 2020 describing the mixing zone in depth. Raum-Suryan described the proportions of western DPS Steller sea lions for each of the five regions and pointed out that, due to a lack of data, the population offshore of each region is assumed to be similar to the population within the region.

Nancy Young then explained how AKRO's guidance would be applied to the M/SI interactions. Young noted that they analyzed only a subset of M/SI interactions from 2014 to 2018 that occurred in the Gulf of Alaska and SEAK. She stated that the data are from a variety of sources including but not limited to observer programs and stranding networks but exclude Native harvest data which will be discussed separately. She noted that there were few interactions offshore of these areas so the estimates are not biased if there is mixing offshore. Young displayed the takes, the region in which they occurred, and described how they were able to assign each take to a region using GIS. Using only the takes that counted against PBR, and the multipliers based on the proportions of western DPS Steller sea lions found in each region, they calculated the number of Steller sea lions allocated to the western DPS that would have previously been assigned to the eastern DPS. Young noted that within the 5-year period (2014-2018), 11-12 animals would be attributed to the western stock, resulting in an increase of 2.2 animals in the mean annual M/SI for the western stock and a decrease of 2.2 animals in the mean annual M/SI for the eastern stock. Although this is not a big change for 2014-2018, it is important to be transparent about this and show that NMFS is accurately reporting M/SI for these DPSs.

Katie Sweeney then described how new PBRs were calculated to account for the western DPS non-pups in SEAK. She described how N_{MIN} was calculated using the agTrend modeled counts with the 2019 data, and reviewed how counts for each sub region were calculated. She also provided the PBRs for the eastern and western DPSs, accounting for the new reapportioning of animals within the mixing zone, and noted that the DPSs have different recovery factors based on their ESA listings. Comparing the new PBRs to the previous PBRs, there was a net increase of 4 animals in the western DPS and a decrease of 41 animals in the eastern DPS.

Lorrie Rea asked how they were dealing with the other three regions in SEAK, for which multipliers were not calculated (due to a lack of data), and Sweeney replied that they used the full counts for those regions.

U.S. Fish and Wildlife Service (USFWS) updates

Patrick Lemons, Chief of Marine Mammal Management at the USFWS Alaska Region, provided a detailed overview of the three marine mammal species that the USFWS manages and updated the SRG on the various research projects being conducted by the USFWS. Beginning with northern sea otters, Lemons pointed out the three stocks that occur in Alaska, including the Southeast Alaska stock, Southcentral Alaska stock, and Southwest Alaska stock which is listed as threatened under the ESA. In preparation for the 5-year review, abundance surveys and analyses for the southwest stock were completed to determine if the status of the stock warrants a change. There were no discernible trends in the southwest stock; some populations within the stock are growing, some are declining, and some are stable. Some portions of the southcentral stock have been surveyed but a significant portion has not been recently surveyed. Delays in 2020 as a result of the pandemic allowed them to take more time to optimize survey design and population monitoring is planned for the southwest stock in 2021. The Glacier Bay National Park System developed a camera-based survey that will allow the USFWS to survey the entire southeast stock in one year and then the analysis will take another year. Lemons provided an update on Native harvest of sea otters, noting that in SEAK, the harvest increased dramatically between 2013 and 2015 and then decreased, but harvest across all of Alaska has since stabilized to around 1,500 animals per year. SARs for the southwest and southcentral stocks are being updated with new information from the species status assessment and a draft should be ready in 2021, while the SAR for the southeast stock will be updated after the upcoming surveys. Lemons then described other USFWS activities, including two oil and gas lease sales that will require incidental take authorizations (ITAs) as well as an ongoing life-history tagging project in coordination with the Alaska Sealife Center and the USGS. He noted that the life-history tagging project was a pilot study but, if successful, it could help identify the

driver of the population decline in the western Aleutian Islands. Lemons also described the ongoing long-term stranding program and an upcoming ship-based survey in the western Aleutian Islands using SCUBA to understand ecological functions and sea otters' interactions with the ecosystem. He also described a survey in lower Cook Inlet designed to better understand how sea otters move about the ecosystem, which he indicated would be valuable information to assess impacts of future oil and gas development and mine development. Finally, Lemons talked about the 2019 stakeholder meeting where concerns were expressed about the rebounding sea otter population impacting the developing mariculture industry, in some cases wiping out entire farms, so the USFWS is working with the State to better understand the conflict.

Beth Concepcion asked Lemons if they knew why the sea otter harvest spiked from 2013 to 2015 and if the harvest allocation was modified as a result of the increase. Lemons replied that the subsistence harvest is not regulated by the federal government for the most part and that only the harvest of the southeast stock would potentially need to be managed; however, there are few Native tribes in that region. Part of the increase was a result of increased harvest effort in Sitka Sound to obtain pelts to teach and share Native traditions and knowledge that had been lost when sea otters were extirpated in SEAK. Another theory is that people began to harvest in large numbers in anticipation that a bounty bill that incentivized harvest, proposed in response to state congressional concerns over the number of sea otters in the region, would pass; but, ultimately the bill did not pass. However, they did not see a similar increase in the harvest of the southcentral stock. Miller clarified that there was a lot of confusion in the mid-2000s about what handicrafts were; however, in a joint workshop with the USFWS, a definition for handicrafts was agreed upon, which cleared a path for the Native sale of handicrafts, resulting in an increased harvest. Due to a loss of funding in Southeast Alaska, however, they were not able to market the handicrafts, so there is a surplus of furs. Lemons noted that the same concern regarding uncertainty about the harvest and the ability to make and sell handicrafts was brought up at the stakeholder meeting. Doniol-Valcroze asked if smaller management units within a stock are based on management needs and concerns or if they take into account the different trends and biological or population dynamics to make the distinctions between the different units. Lemons replied that these smaller management units in the southwest stock were designated in the recovery plan after ESA listing. He said that they were loose management boundaries based on their understanding of what is happening in each unit and, in some cases, on their understanding that sea otters do not have the ability to disperse across open water. Doniol-Valcroze asked if PBR is apportioned for each unit or if it is a stock-wide PBR. Lemons responded that he believes it is a stock-wide PBR. Doniol-Valcroze then asked if they have considered apportioning PBR since the units have different population dynamics. Lemons agreed they should consider apportioning PBR, since a recent genetics study (in review) showed that, based on genetics, the boundaries are correct. Rea asked about the work being done in the western Aleutians and if they are looking for a specific driver or if it is more of a fact-finding study. Lemons replied that the dive studies have been ongoing intermittently with the USGS. There are two recovery criteria in the recovery plan, one of which is ecosystem-based and is based on benthic survey data. He pointed out that past dive surveys have identified that there is not a food shortage in the western Aleutians, so they hope to better understand what might be driving the population dynamics that are limiting recovery. Lemons mentioned that killer whale predation has been hypothesized as the driver for listing sea otters and for limiting recovery, but this is difficult to confirm. He also said they hope that the development of the life-history tags will help provide evidence of predation and provide a more holistic understanding of what is happening.

Lemons continued with an update on Pacific walrus. He described their range but noted that they have been seeing distribution and timing of haulouts shift, which could correspond with declines in the sea ice that is specifically important for walruses. A species status assessment completed in 2017 did not warrant listing under the ESA due to the large population size (280,000 in early

results from a 5-year genetics-based mark-recapture study) and a decline in harvest. Lemons acknowledged the wide confidence intervals (CI) due to the study design and the animals' large dispersed range. The most recent population estimate was developed in 2017 and work is ongoing to analyze the 5 years of data before publication within the next 6 months. He then shared harvest data from 1960 to 2018 and pointed out the historically low levels from 2014 to 2015 that reflected the decline in ice observed during that time. A statistician, who was temporarily pulled away, has resumed work on a 2013 mark-recapture pilot study that will contribute to the 5-year review. Current work also includes haulout mortality estimation, to capture the trampling mortalities on land and in the water, and a project with Alaska Native communities to develop a robust harvest monitoring program, specifically with St. Lawrence Island Natives to limit the number of animals harvested. They hope to expand this work throughout the stock's Alaska range, which would help address ESA listing concerns over Native harvest. Lemons said there is also a study looking into understanding the sound levels of overhead flights to provide guidance for pilots, since overhead flights have been known to trigger disturbance and resulting mortality events. Work planned for 2022-2023 includes genetic mark-recaptures and a collaboration with the USGS to continue development of a Population Consequences of Disturbance (PCoD) model to help understand the effects of oil and gas development as well as ship traffic on the haulouts. He mentioned that they recently hired a Russian contractor to increase collaboration with Russian colleagues and to better understand the population in Russia, where the entire population is known to haul out. They will also be developing a harvest monitoring program in Russia to get better harvest rates and there is a pilot project for using mark-recapture of carcasses to estimate haulout mortality at Point Lay to correct for the animals lost at sea.

Williams asked if they have witnessed a change in body condition based on the changes in life-history characteristics and habitat use. Lemons replied that the information is not readily available since body condition comes from subsistence harvest, which takes place in spring when animals have been hauled out on the ice all winter. He admitted that evaluating body condition in spring was likely biased, but they are working with the USGS to develop a system similar to what they have in place for polar bears. Regehr asked what management and harvest monitoring system is currently in place in Russia. Lemons replied that there is a quota system to harvest walruses in Russia, with a monetary incentive to fill the quota. So there is incentive to report harvest regardless if harvest occurred, which may result in overestimation. In the U.S. there is no incentive, so harvests may be underreported. O'Corry-Crowe asked how the population estimates from the haulouts compare to the genetic population estimate. Lemons replied that the haulout estimate comes from a Native expert's visual estimation and the data show that we are vastly underestimating because the animals are grouped so closely together that they are not getting a completely accurate estimate of animals on land and in the water. O'Corry-Crowe asked if they have considered close-kin genetic mark-recapture and how that might relate to more traditional methods. Lemons replied that one of their efforts is focused on close-kin genetic mark-recapture and the other effort is using a large SNP catalog on a cutting-edge analysis in collaboration with Ver Hoef (MML). Lemons said there is also another effort that is part of the population model approach to try to get an idea of the number of animals dying in haulouts each year, comparing animals harvested to animals dying on haulouts to try and identify the most important stressors to help target management efforts. Citta then asked if the haulout mortality fluctuations at Pt. Lay were due to a lack of reporting. Lemons replied that they worked with the local community and found that there was increased mortality. They are also prosecuting some pilots that were reported by the local community to be flying too low. Citta asked how they get mortality information from the haulout at [Serdtse-Kamen?]. Lemons replied that they rely on reports from a local expert who estimated 10,000 animals were hauled out around 2012. Numbers have decreased since then and more recently it has been about 3,000 animals, which appears similar to Pt. Lay; however, it is difficult to confirm without reports from Russia. Citta then asked how mark-recapture estimates are used to estimate mortality on haulouts. Lemons did not

know the details but noted that they tag carcasses on the beach to get an estimate of mortality, but it is likely an underestimate.

Lemons then provided updates on the two polar bear stocks managed by the USFWS: the Beaufort Sea stock managed in collaboration with Canada and the Chukchi Sea stock managed via a U.S.-Russia treaty. With the USGS, they have updated population estimates for both stocks. The Chukchi Sea stock population estimate published in 2018 was about 2,900 animals. A survey of the Beaufort Sea stock in the southern Beaufort Sea, led by the USGS, was composed of two different components: a visual-based aerial survey and a mark-recapture satellite collar survey in which the data stream ended in 2016 but indicated a relatively stable population. A harvest risk assessment conducted for the Chukchi Sea stock estimated that 85 animals, split between the U.S. and Russia, could be sustainably harvested. The assessment had several assumptions including effective harvest reporting and updated population estimates every 10 years. Lemons stated that the last survey was 5 years ago and they are trying to figure out how to fund future population monitoring. They also recently updated the boundary between the two stocks, which involved deciding whether the boundary should be at Pt. Barrow or Icy Cape; however, a study using satellite collars, published in 2018, indicated that Icy Cape is an appropriate boundary, so they are working with the State Department to change the boundary to which the treaty applies. They are also trying to understand the impacts of oil and gas development, given a 2020 publication that documents the impacts of seismic surveys on denning polar bears. There has been a hiatus in the study in the Chukchi Sea since 2016 because of a decline in sea ice and unsafe survey conditions, so now they are working on an alternate plan to estimate and monitor the population. Recently they have collaborated with MML and NMFS to conduct instrument-based aerial surveys in the Beaufort Sea in hopes of increasing the detectability of bears so it will be a viable method for monitoring. They have also funded a study to analyze bear behavior in relation to tourist viewing activities as well as a joint study with industry and the USGS to detect artificial polar bear dens using forward-looking infrared (FLIR), and they began a study to test new technology and its ability to detect dens. They have developed a species status assessment manuscript and hope to submit it for publication soon. They have also submitted a manuscript on a literature review of the effects of human disturbance on denning in response to a petition for ITAs from the oil and gas industry. Lemons also described another project that is studying the phenology of denning behaviors and emergence from the den and the potential impacts that the bears face. They are also looking at assessing deterrence efforts to see what is most effective. Lemons noted that they must find other methods to survey polar bears in the future because of the poor ice conditions and noted that they are considering moving the Chukchi surveys north toward Pt. Barrow where ice conditions are more favorable. He also highlighted their increased efforts to collaborate with Russia, for example, by hiring a Russian researcher. Lemons noted the upcoming 5-year review (in two years) and said that they are developing a species status assessment that will be ready to present at the 2022 Alaska SRG meeting. They are continuing to work on managing human-bear interactions and the USFWS has funded a program run by Natives to patrol and haze bears to keep them away from communities. The USFWS has a 2018/2019 SAR update that is pending, but SAR updates will be needed soon, because there have been new estimates since then.

Regehr expressed concerns about the southern Beaufort Sea subpopulation of polar bears being the most at risk with declining abundance, reproduction, and survival and facing impacts from the development of oil and gas and asked if there will be more active co-management agreements. Lemons replied that he does not have a great answer for that, but harvests have decreased considerably in Canada and he suspected they will decrease in the U.S. as well. He stated that PBR was not intended to be used to determine the number of authorized takes. He said that it is a longer-term conversation with the North Slope Borough (NSB) to figure out how to fix this issue by implementing a risk assessment plan and gauging their interest in adopting the plan. Kanayurak

pointed out that subsistence harvest has historically been outlined as a threat because it can be directly managed; but, given the plan for the harvest risk assessment, there should be a balance between developing a quota, continuing traditional practices, and regulation of harvest. She commented that a more stringent quota might result in people wanting to fill that quota; but she appreciated the USFWS bringing up these issues and working on understanding how each plays a role in the status of the stocks. Lemons replied that in the listing decision, they identified walrus harvest as a threat assuming it would always be a factor; but, in the 2017 finding, they did not find it to be a factor because accessibility to the animals will continue to decline and so should the harvest, but they are not confident on that stance. Regehr asked to what extent the USFWS thinks haulout mortality is density dependent and if it will be alleviated with a population decline or if it is a function of other factors and stochastic processes. Lemons replied that he does not think the walrus populations are density dependent unless they start breaking out into smaller groups. He thinks that as long as the females and juveniles are hauling out in these large dense aggregations it will result in mortality events.

Review of draft 2021 Alaska SARs

Southeast Alaska harbor porpoise

Miller provided his review of the SAR and highlighted how the SAR has shifted from broadly-based population estimates to updates only of populations that have been surveyed in the inland waters of SEAK. He noted that the SEAK harbor porpoise stock ranges from Cape Suckling to Dixon Entrance; however, the only updated information presented in the SAR is from Cape Spencer to Dixon Entrance and this should be emphasized early in the SAR. He pointed out that a 1997-1998 population estimate for the entire stock is referenced at one point in the SAR and then not mentioned again, so it is important to clarify that this SAR presents an abundance estimate for only a portion of the entire stock. He noted that Figure 2 in the SAR does not show the boundary between the northern and southern harbor porpoise regions in SEAK that was shown in the map in Zerbini's presentation on Day 2, and he asked if Zerbini's map would replace the map that is currently in the SAR. Miller stated his concerns that the Status of Stock section is focused on the portion of the stock in inland waters with no mention of the porpoise in outside waters. He noted that PBR is based on the portion of the stock in inland waters but mortality includes data from a Yakutat fishery in 2007-2008 that is outside of the survey area for the abundance estimate in the SAR. He asked how appropriate it is to compare human-caused mortality to a portion of the stock. Zerbini replied that the 1997-1998 estimate is more than 20 years old now and may no longer be accurate, so they wanted to focus on current information. He stated that it is important to make the distinction in the SAR that part of the M/SI is from Yakutat and part is from the three fishery districts in the inland waters of SEAK. Miller asked if the 1997-1998 estimate should be included in the SAR or if the SAR should mention that the estimate is no longer valid, since the average person would be concerned that the previous estimate was ~11,000 animals and the current estimate is ~1,300. Zerbini agreed that it might not be worth including the 1997-1998 estimate, but it could be helpful from a historical standpoint. Williams commented that the amount of historical information to include is a general issue but perhaps adding some clarifying language or making a specific section for the current SEAK survey could help.

Regehr provided a higher-level review and noted that there is an overwhelming amount of detail in the SAR but it does not present how little is known about the stock or the questions that exist regarding stock structure in a way that is digestible by a reader. He thinks it is critical to include the 11,000 estimate unless there is a strong reason to suspect there has been significant M/SI or habitat change. Regehr said that making all of the unknowns and uncertainties more clear, maybe with an executive summary at the beginning of the SAR, would be beneficial to readers since it is easy to get lost in all of the historical context that is presented in the SAR. Williams then mentioned that this could be a potential recommendation and also noted that the most recent information has not been

included in the current draft SAR. Zerbini replied that the analysis had not been completed at the time the draft SARs were sent out for review but asked the SRG if the new information should be included in the 2021 SAR or the next SAR revision. Williams responded that it would be helpful to include the new information about the differentiation in stock structure, which may help clear up or reduce some of the uncertainties that Regehr mentioned. She pointed out that there is a potential conservation concern with the smaller sub-population in the south and, looking back on the SRG's previous recommendations on observer coverage, she thought that this year perhaps their recommendations could focus on different types of research that can be more realistically addressed. Williams asked Zerbini to confirm that the probability of detection used in the SAR is 1 and Zerbini replied that there is no g(0) correction (i.e., the probability of detection = 1). Williams asked if Zerbini recommends using the g(0) value from his manuscript (Zerbini et al. in prep.) in the SAR. He replied that it is not a conventional way of estimating g(0); however, they are comfortable with using it in the SAR but it is important to note that it should not replace the traditional way of computing g(0). Doniol-Valcroze agreed that it was a good solution when other options are not available and he would not have a problem including it in the SAR, but he would be hesitant to cite an unpublished, non-peer-reviewed source in the SAR. Angliss mentioned that this SAR is unique because there are multiple analyses that are all in different stages of completion. There is a great stock analysis that is close to completion, but it still needs to go through several steps in the Agency's stock designation process. She added that the delineation line between the northern and southern regions presented by Zerbini on Day 2 is not included in the SAR because we're trying to include only published information and it is challenging to stick to the guidelines and incorporate as much new information as possible. Angliss then commented on the wordiness of the SAR and acknowledged that as information continues to be added to SARs, some of them need to be rewritten; she asked the SRG to flag those SARs so they can be corrected. Doniol-Valcroze stated that he would be fine with the SAR as is this year if there would be an opportunity to review a revised version next year once the data have all been published. Angliss replied that there is a conservation issue here and so they are trying to get everything finalized and put together so they can add it to the SAR as soon as possible. Doniol-Valcroze responded that it would be helpful to note in the text that the abundance estimate is uncorrected but that work on a corrected estimate is ongoing. In general he thought the SAR was clear and not too wordy but noted that comparing the M/SI for the entire population to the PBR for the portion of the stock in inland waters is confusing and should be clarified. He commended the authors for producing a SAR with new survey results but pointed out some inconsistencies in the abundance estimates reported in the SARs preface and the SAR text.

Citta agreed with the previous review comments and asked what the next steps are considering there is a potential conservation issue and a lack of understanding of the stock structure, abundance, and movements of the harbor porpoise outside of the inland waters. Zerbini agreed that these are important issues to understand and that funding for surveys is needed to really address that gap in the understanding of SEAK harbor porpoise. He stated that they also need to monitor bycatch since the bycatch estimate is based on observer coverage of only 6.5% of the fisheries and they are 10-year-old estimates, so getting a sense of the actual M/SI would be beneficial. Citta asked if there are plans to do that.

In response to a previous comment from Doniol-Valcroze regarding the inconsistencies between the areas where M/SI and abundance are estimated, Angliss replied that we need to be clear when there is a mismatch like that in the SARs. The solution is to get better mortality estimates. She then addressed Citta's comments by stating that PacMAPPS and ArMAPPS are a partial solution to assessing cetacean abundance but they are not designed to address the SEAK harbor porpoise information gap, so they will work on plans to address those gaps and try to get them supported as soon as possible.

O'Corry-Crowe commented that the structure of the document is confusing and that it should be made clear early in the SAR, perhaps with an executive summary, that the SAR is focused on the portion of the stock in inland waters for ecological or demographic reasons. He then asked if there was a way to extract an estimate for inland waters from the Hobbs and Waite (2010) analysis and use that as a historical estimate for inland waters. Zerbini replied that there is a way to reanalyze the data but he was not sure about the status of that aerial survey data. O'Corry-Crowe replied that it would be of interest to make the case for focusing on the inland waters in the SAR.

Concepcion agreed her biggest takeaway was that the SAR was focused on assessing harbor porpoise in the inland waters of SEAK, not the entire range, and stating this up front would be helpful. She added that she appreciated the addition of text on algal toxins in the Habitat Concerns section of the SAR in response to the SRG's 2020 recommendation.

Miller responded to Angliss' comments regarding M/SI and PBR for different areas by noting that, from a fisherman's point of view, it would raise red flags to see human-caused mortality from a different fishery being applied to his fishery. Zerbini replied that his take-home message was that clarifying text in the SAR in response to the SRG's comments will help the authors explain the issues (e.g., that different areas are assessed for abundance, bycatch, and total M/SI) so that the readers can better understand them.

Cook Inlet beluga whale

Doniol-Valcroze expressed his appreciation for the annual updates to this SAR and for all of the information that has been coming out each year. He asked for additional clarification on NMFS' response to the AK SRG's 2020 recommendation which asked for clarification about the differences between the conclusions by Wade et al. (2019) in this SAR and Jacobson et al. (2020). Doniol-Valcroze presented a slide comparing the population trends from both publications and pointed out the differences in the input data, estimated aerial survey abundances, and the modeled data. His interpretation is that the difference in input data is whether to use the median or highest group-size estimate. Wade et al. calculated the median of all acceptable estimates resulting in the estimate of 279 animals that is used in the SAR. In contrast, Jacobson et al. took the mean and variance estimated from the best day of aerial survey data, which sounds like they used the highest group estimate of more than 300 animals. Paul Wade apologized if the response to the SRG's recommendation was not sufficient and noted that he thought the questions were mainly about the difference between current and previous trends, not the difference between the two analyses. He confirmed that the Jacobson et al. estimates use the day of the year with the highest estimate, so in a 5-day survey, they would use the day with the highest count and ignore the others. He pointed out that it is a Bayesian analysis that shows the sampling distribution of the estimates, and it is fairly straightforward to show that it introduces positive bias into the abundance estimate depending on the CV of the abundance estimate and how many days are being used. He noted that simulations of sampling from log-normal distributions from 1994 to present resulted in a positive bias between 5 and 50%, which he was not comfortable with, since the bias changes over time as a function of the CV which changes dramatically over time. Doniol-Valcroze highlighted the difference between the two models and stated that Wade et al. is using a moving average that is weighted for more recent estimates, but it does not try to impose an underlying population dynamics model or structure. Jacobson et al., he continued, used an integrated model to do just that and can estimate what is likely based on all of the instructions and distributions, which is why he would have preferred this kind of model. However, one concern about the Jacobson et al. model is that it has fixed survival parameters that do not change over time; so, if there are no removals, the estimate cannot decrease, which is an issue for a population that seems to go up and down for reasons we do not understand. Wade agreed with his interpretation and noted that it is an age-structured model with constant

survival and constant maximum fecundity so it does have density dependence in it. He said it was nearly the same as fitting a constant exponential trend model to the data; it could reflect a decline, however it is hard to tell because that would be a function of the prior distributions they set up for the survival rates and fecundity. Wade stated that in the past he has often sampled from those priors and then calculated the lambdas to see what the implicit prior distribution is for lambda to see if it would allow a decline, which Jacobson et al. did not do. Another nuance, Wade mentioned, was that because it is a constant trend model, it can only run through the abundance estimates prior to 2000, which is when hunting essentially stopped, so it cannot capture the decline, the increase, and then the further decline in the data since it is a constant trend. Wade noted he used an exponential weighted moving average, which is essentially like a non-parametric model that is not really trying to model abundance. He agreed that in some cases it would be better to use a model to pull out the modeled abundance and the most current year, as in SARs where there is a constant trend, to get a more precise estimate; but, for this situation, it is problematic. He pointed out the Jacobson et al. model did not include the 2018 estimate, which would have resulted in a substantial lack of model fit at the end of the trajectory where their model is high relative to the actual abundance estimates. It also uses the maximum estimate of each day, which introduces positive bias, and those two things violate the concept of N_{MIN} (i.e., that the true abundance is higher than N_{MIN}). Doniol-Valcroze appreciated the clarification and agreed with Wade. He stated that even though the Jacobson et al. model would have the potential to impose a biologically plausible population dynamics model on top of the data, he agreed that the Wade et al. model was the best one to use in the SAR.
Citta also agreed that he liked the Wade et al. model better and felt it was more realistic, although he wondered if Wade et al. was using the median because of bias introduced when large groups are counted and double counting could occur, resulting in group-size estimates that are biased high. Wade replied that they do not double count; when they circle large groups they count on a single pass going a single direction and their current methodology to estimate group size is explained in Boyd et al. (2019). He added that when MML statisticians carefully reviewed the analysis, however, they pointed out that the Boyd et al. method could be improved since the modeling of group size has a Poisson distribution in which the mean and variance are the same and they are likely looking at over-dispersed data. So they could experiment with using a different underlying distribution for that piece of the model, since they could have overestimated the group size of really big groups, but that is why using the median is good to balance some of that out. The abundance estimates for 2009 and 2010 were high as a result of particularly large beluga whale aggregations and in those years Jacobson et al. used the maximum days, which were outliers to the other survey days and likely overestimates of group sizes on those days. If we used those maximum days and looked at the trend from 2004 to 2010 it would be an incredibly implausible increase for beluga whales, while using the medians and smoothed trend makes it more plausible. Citta agreed that the median provides the best estimate of trend but said if there is not bias while counting big groups, then the maximum day might have more value and asked what the source of bias might be from in the maximum counts. Wade replied that the Poisson distribution does not model that well and even if that bias is not present, the maximum day introduces positive bias; with the large sampling error around the group-size estimates, it is easy to demonstrate a positive bias of 5-50% depending on the CV and the number of survey days. Citta's final comment was that the historical estimate of 1,300 beluga whales in Cook Inlet is likely biased low given that a similar system in Bristol Bay can easily support up to 2,000 beluga whales. Wade replied that it was a good point and that it would be helpful if the SRG could recommend a few summary sentences (i.e., an executive summary) that they could consider adding to the SAR.

O'Corry-Crowe commented on Figure 4 of Wade et al. (2019), noting a couple of days in 2009 and 2010 with really high estimates and how different these estimates are from Rodd Hobbs' method indicating a lot of dispersion. He then requested information on what the Agency believes are the

factors causing the decline or lack of recovery and if that information can be included in the SAR. Wade replied that he took over the Cook Inlet beluga whale project in 2017 and he thinks they should be conducting photo-identification mark-recapture surveys because this is a difficult species to survey with aerial surveys. He then stated that information needs to be peer-reviewed and published before it can be put in the SAR, but with recent work by MML and by Tamara McGuire and other colleagues, he believes there will be a lot of information published in the next few years that will provide indicators of survival and fecundity rates. He also noted that possible causes are documented in the Recovery Plan, which is an ESA document. O'Corry-Crowe pointed out that mortality data in the SAR includes 95 dead animals recovered in 12 years (an average of 8 per year) and asked if that information can be used to account for how many animals are dying, which animals are dying, and what they are dying from. After some discussion, Wade pointed out text in the SAR that states that with an average survival rate of 0.95, 14 deaths would be expected per year, so it is hard to conclude anything from the 8 deaths per year reported by McGuire et al. (2020) or the 10 deaths per year reported by Burek-Huntington et al. (2015) in the SAR. O'Corry-Crowe said that if they are working hard to figure out the cause of mortality for the animals, it could help explain the trend. He then asked how many are adults and calves and what are they dying from. Wade replied that they know what the veterinarians have concluded from the necropsy reports, but there is not a clear signal as to a single driving factor, however, the SAR does summarize the known causes of mortality.

Williams commented that there may be value in understanding the underlying causes for the deaths of the stranded whales.

Rea commented that considering the population's low abundance, low mortality from predation, lack of harvest, and 2% mortality, she wondered about calving rates, but noted that Wade said fecundity and survival estimates might be coming out soon. So she asked for Wade's insights on these estimates. Wade replied that it is a small dataset and very preliminary, but they think they are seeing signs of a very large delay in age of first reproduction. He stated that they just published an epigenetic aging paper where they were able to get an estimate of the age of biopsied whales. With labs closed down due to the pandemic, they have not received hormone data from the 2019 samples; however, half of the 2016 and 2018 samples of ~30 animals were female, four of which were pregnant. Only 1 of 10 females aged 10-20 was pregnant, whereas, 3 of 5 females over age 20 were pregnant. Robert Suydam's data from the Eastern Chukchi Sea stock showed that more than 40% of females age 10-20 were pregnant (Suydam 2009), so this suggests the Cook Inlet population has a delay in age of first reproduction. Suydam estimated an average age of 8 at first reproduction for the Eastern Chukchi Sea stock and it could be double that for the Cook Inlet stock. Wade noted that if the population is food limited, you see a responding change in the age of first reproduction, but he also noted that the overall fecundity rate could be low as well, even for fully adult whales.

<u>Alaska Dall's porpoise</u>

Doniol-Valcroze pointed out the new abundance estimate in the SAR is based on a 2015 vessel survey by Rone et al. (2017), and he had an issue with using a point estimate from the 2015 survey as N_{MIN} rather than calculating N_{MIN} as the 20th percentile of the log-normal distribution of the estimate. Doniol-Valcroze highlighted that the SAR authors say that, despite the caveats, it is reasonable to assume this stock is at least equal to or greater than the estimate, with the caveats that the estimate is not corrected for perception or availability bias (negative bias) or for attraction to the ship (which has been estimated as high as a five-fold positive bias in past studies). He expressed his concerns about the precedent of using a point estimate for N_{MIN} simply because the survey covered only a portion of the range but not about the actual number given that the previous estimate for the entire range was in the hundreds of thousands. Zerbini responded that he agreed in principle but thought the point estimate was a more realistic N_{MIN} because the survey covered only

a small fraction of the stock's entire range, although setting a precedent should be considered as well. Doniol-Valcroze agreed that it is a realistic and plausible number for N_{MIN} in this case, but there could be cases where the true population estimate is actually lower than the point estimate of the survey and he expressed concern that in the future the point estimate will be used if it is a partial survey. Zerbini suggested it be considered on a case by case basis, which Doniol-Valcroze accepted but mentioned it would not work in all situations.

Regehr expressed concerns over using numbers in the SARs with the justification that they are "conservative" and then using them in other calculations throughout the document, such as abundance estimates for a portion of the range or M/SI that occurs on the border between stocks and is assigned to both stocks. He asked the group about their thoughts on this and if there is a standard approach. He thinks there is a risk with adopting numbers on the basis that they are conservative and asked if there is guidance on when authors should present these conservative numbers and if there is a danger that it is misleading to use them. Patterson asked Regehr to clarify whether he meant that NMFS should not describe decisions as being conservative in the SARs or if conservative numbers should not be included in the SARs. Regehr replied that his question was if the SARs are the appropriate place to make analytical and numerical decisions on the basis that they are conservative. He stated that policy makers and managers need the right or best number, not the conservative number based on a value system. Patterson replied that their goal is to be confident that the actual value is greater than the N_{MIN} value. He acknowledged that it is tricky using a point estimate for the partial range of a stock, but point estimates (e.g., counts) are used in other SARs. Regehr replied that N_{MIN} plays a larger role than a minimum number since it is a statistical quantity. Patterson replied that he wasn't suggesting that we use the lowest number we have; we need to be confident that the true abundance is higher than N_{MIN}. Bettridge pointed out that the important thing for folks to recognize is that managers do not use numbers from the summary tables in the SARs. The information in the text of the SAR, the qualifications on the data, and the confidence in the data makes a difference in terms of guiding management decisions.

Williams mentioned that similar to the SEAK harbor porpoise stock, this species is likely interacting with largely unobserved state fisheries, but it is much less of a conservation concern. If we get additional information on harbor porpoise interactions we might also get some information on Dall's porpoise interactions with the same fleets. She stated that there seems to be some uncertainty about Dall's porpoise stock structure, based on the information in the introduction, and the historical information is unclear; she asked about the delineation between the stocks since the information is based primarily on population response data and preliminary genetic analyses from 1988. She suggested that the stock structure information could be updated and clarified. Kim Goetz agreed and replied that this is something they can fix.

Kate Stafford commented that the incidental take seems incredibly low and pointed out that one take identified in Young et al. (2020) from a drift gillnet is not mentioned in the SAR. The take mentioned by Stafford was determined to be a non-serious injury (NSI) and only mortality and serious injuries are reported in the SAR.

Long noted in the meeting's chat log that the MMPA defines N_{MIN} as a "minimum population estimate" based on best available scientific information on abundance, incorporating precision and variability associated, and provides reasonable assurance that the stock size is equal to or greater than the estimate. Doniol-Valcroze commented that based on this definition, what was included in the SAR is acceptable. He admitted that he wanted to flag this issue to prevent it from becoming a common solution to a common problem, since many stocks have surveys of only a portion of the range. Doniol-Valcroze also suggested retaining the historical population size information in the SAR, to provide context for the current estimate.

Western Arctic bowhead whale

Update on 2019 surveys

Megan Ferguson provided the SRG with updates and summaries of two independent surveys in 2019 that were focused on obtaining an abundance estimate for western Arctic bowhead whales. The first survey was a spring ice-based survey by the NSB using methods consistent with past surveys; preliminary results were presented at the 2020 International Whaling Commission (IWC) meeting. The survey estimated 12,500 animals (95% CI approximately 8,000 to 12,500, CV = 0.228). Ferguson noted that Geof Givens (Givens Statistical Solutions, LLC) recently developed a correction factor to account for boat traffic that deters the whales, which resulted in a higher, revised abundance estimate that will be presented at the 2021 IWC Scientific Committee meeting (Givens et al. 2021). The second survey she described was a summer aerial line-transect survey in collaboration with the Bureau of Ocean Energy Management (BOEM), NOAA, and NSB. The survey statistics were posted online in BOEM's annual report and Ferguson reported that she conducted a preliminary geographically stratified analysis to see what the abundance estimate might be. She provided a summary of their sightings, which came from surveys involving three aircraft, showing the study area from shore to the 200 m isobath, with additional lines extended to Banks Island. She mentioned some logistical challenges that came up during the survey, but from 13,000 km of survey effort, they counted 239 whales from 159 sightings, mostly in the expected areas, but the distribution in the eastern Beaufort Sea was farther offshore than previously seen in August, which is one source of potential bias. Ferguson described the analytical methods used (Ferguson et al. 2020). Her preliminary results indicated an abundance estimate of 14,531 with a wide CI and high CV, largely as a result of trackline detection probability and sampling variability across transects. Ferguson mentioned that a revised analysis is underway using a hierarchical spatially-explicit density surface model and that she plans to revisit the parameter estimates used to compute availability bias and will incorporate the ADF&G satellite telemetry data on surface intervals. Ferguson expects an intersessional IWC Scientific Committee working group to discuss the results prior to the 2022 IWC Scientific Committee annual meeting.

Doniol-Valcroze asked if Ferguson used a variance estimator like σ^2 or R^2 that are better at handling clustered data. Ferguson confirmed she used R^2. Doniol-Valcroze noted that Ferguson mentioned potential bias about whales being farther offshore than usual; however, Ferguson's map showed that they surveyed beyond the end of sightings and so he stated that he would not be worried about it. Ferguson mentioned that Givens had concerns about the area northwest of Inuvik, Canada, and that Lois Harwood (Fisheries and Oceans Canada, DFO) also thought that they needed to go up to Viscount Melville Sound (VMS), north of Banks Island, where Harwood thinks they would have found bowhead whales. Ferguson also acknowledged that some bowhead whales go to Russia every year and that although she cannot quantify these biases she should address them in the discussion section.

Citta asked Ferguson and Doniol-Valcroze about surveys in Canada and if there are any estimates available from them. Doniol-Valcroze replied that he would look into it. Ferguson replied that she was asked to use her data to produce an abundance estimate for the Beaufort Sea beluga whale stock, which was the primary focus of the Canadian aerial surveys. She mentioned that Canadian researchers surveyed immediately before her August surveys and that they were unable to get their desired coverage due to persistently bad weather. Ferguson stated that they saw many beluga whales during their survey but it was not the optimal time to survey the stock. She also noted that she assumed the Canadian researchers were not going to try to get bowhead whale estimates from their survey data. Doniol-Valcroze stated that he has not seen any of that data and he is not aware of their plan.

O'Corry-Crowe asked Ferguson if there were any aspects of behavior or the environment that would have made her think that 2019 was an unusual year. Ferguson replied that things did not change until September and October, so she was confident that they had good survey coverage and that their survey covered the bulk of the population, with the exception of any animals traveling to Russia or VMS.

Stafford requested that the SAR be updated once Ferguson's final estimates and the final estimates from the ice-based surveys are complete. She also expressed concerns about climate change, noting that 5-6 liquefied natural gas tanker vessels transited the Bering Strait past St. Lawrence Island and critical bowhead wintering habitat in January 2021, and that is something to keep in mind in terms of habitat and human impacts on bowhead whales.

Citta commented that he does not know how entanglements in pot fishing gear will change; the last time they looked at the overlap between bowhead whale distribution and pot gear was in 2018, but that it is something that will need to be revisited. He also noted that the SAR will need to be updated with Ferguson's estimates.

Doniol-Valcroze acknowledged that, based on the population's trajectory, there is no concern about M/SI approaching PBR, but he asked if text needs to be added to point out that the current abundance estimates are older than 8-years, as has been done in other SARs. Stafford commented that they expected an updated population estimate from an ice-based census and aerial census in 2019, but due to poor ice conditions and an earlier than normal hunt, they were unable to conduct a safe and reliable census. Doniol-Valcroze acknowledged her comments but asked if the SAR will indicate that the estimate is too old. Angliss mentioned that there is a way to retain an old abundance estimate in the SAR if there is high confidence that the population is increasing, which has been done in other SARs. Doniol-Valcroze supported retaining the abundance estimate in this case, given the evidence of the population's positive trajectory, but thought it should be justified in the SAR. Muto said that similar text was added to the humpback whale SARs and can be added to the bowhead whale SAR as well. Doniol-Valcroze added that DFO will not be able to produce bowhead whale estimates from their aerial surveys due to lack of data as a result of poor survey conditions.

Concepcion had no significant comments that had not already been addressed but noted that a significant portion of the cod and pollock populations have moved north into the northern Bering Sea, so fishing effort, including the cod longline fishery, will move north as well. Miller commented that the SAR mentions fishing concerns in the eastern Bering Sea and said that whalers have been seeing pot gear they believed to be of Russian origin and that marine debris of Russian origin is becoming a bigger issue. He also pointed out that as a result of reduced shipping traffic due to the global pandemic, whales appear calmer and closer to shore and that these observations have been summarized by Billy Adams (AEWC). Citta replied that 5 years ago, Russian pot fisheries were not an issue, but recently they have heard that Russian pot fisheries have been increasing and there is a lot of gear on the Russian side. He noted that usually they are not able to identify the source of the gear in whale entanglements, but everyone is concerned about the entanglement scars on bowhead whales.

Williams noted that the SRG could have recommendations about the impacts on bowhead whales of fisheries moving north.

<u>Eastern Pacific northern fur seal</u>
O'Corry-Crowe commented that this SAR was straightforward and included an update on survey data from the 2019 Bogoslof Island survey, as well as an updated abundance estimate and N_{MIN}. He

pointed out that the overall 20-year trend is still downward but the 10-year trend is not significantly different from zero, as the St. George Island population has stabilized and the population on Bogoslof is increasing. He also noted that M/SI is not close to PBR.

Rea noted that the SAR was well written and highlighted the monitoring efforts from co-management committees on St. Paul and St. George. She then asked if there are independent trends on St. Paul and Bogoslof or if there is an emigration/immigration component. Rolf Ream replied that the immigration study on St. George and St. Paul is designed to overcome obstacles with the vital rates study to assess if they are actually losing animals from the population or if they are moving to nearby, unsurveyed rookeries. He noted that they do not have much effort on Bogoslof to monitor for VHF-tagged animals. They put out 15,000 to 18,000 tags in the last 10-12 years on St. Paul and St. George and did not see a single animal flipper-tagged on Bogoslof, even though the growth rate there has been much higher than intrinsic growth, so they expect there is some movement of animals.

Regehr thought the SAR was well written and reflected a huge amount of work and he commended the authors. He had an analytical question regarding the abundance estimate and variance, wondering if they could resample the original data to determine the uncertainty associated with the expansion factor. Regehr noted that their estimates of abundance are very precise and asked if they are more precise than necessary or if they could reduce the sample size and potentially allocate effort elsewhere. He was also interested in the spatial dynamics and connectivity among animals using different rookeries, which he acknowledged is being investigated. Regehr also requested more information regarding how much of a concern potential fisheries interactions are for this stock, considering the large PBR and low M/SI. Finally, he noted that the subsistence harvest targets juvenile males and wondered if it was strictly a conservation measure due to their lower reproductive value. Ream confirmed that the harvest of juvenile males is primarily a conservation measure and it is still important since the largest take is occurring on St. Paul where the population is still declining. He pointed out that juvenile males include ages 4-5 down to pups and that this was a significant regulation change. Ream stated that the expansion factor was the primary purpose of their vital rates tag-resighting project to get age-specific rates of natality, mortality, and reproduction. He acknowledged that these results will be a static snapshot in time, and he is not sure how they would be used in the future, so they are discussing population modeling for a more dynamic approach. Rod Towell mentioned that the tagging studying will provide more recent data, which is one reason they have not revisited Lander's (1981) expansion factor, and that there are several modeling projects underway that are using an age- and sex-specific model structure. The goal is a more dynamic expansion factor with associated variance that will produce a better estimate. He also pointed out that the 0.5 CV for the abundance estimate can be considered precise, but it is technique-based because the same people have been doing the sampling for a long time, so there may be more variance than they're seeing in the current model. He thinks they may be able to get the same value with less effort, but they have not investigated that yet. Towell commented that his understanding was that there was a preference for not killing female fur seals in the traditional culture.

O'Corry-Crowe asked how volcanic eruptions on Bogoslof Island are impacting habitat availability. Ream replied that the 1992 eruption was during the summer and they saw a lot of carcasses but, in the most recent eruption, he thinks the animals were able to sense something and get out of the way. In terms of habitat, the last eruption significantly increased the size of the island, which is beneficial to the fur seals as long as they have resources around the island. Towell commented that they did notice the rookeries were more condensed than before.

Williams mentioned that the SAR points out indirect interactions with fisheries and that a new publication that states that nutritional limitation is a real concern is not cited in the SAR, so she wondered if that was an intentional omission or if they did not have time to include it. Ream replied that the 2020 publication would be relevant to include but it came out after the draft SAR was prepared; however, it is something they could include in the next revision. Williams acknowledged that this was a well-written SAR for a data-rich stock but pointed out that there are some unanswered questions about potential demographic shifts and immigration. Ream replied that surveys planned for 2020 were cancelled, so they hope to go out in August 2021. Towell replied that they will be coming up with some creative solutions to get whole-island estimates for both islands, but noted that the effort will likely be different than in previous years.

Closing remarks and plans for 2022 Alaska SRG meeting

Williams thanked all of the SAR authors for their participation, presentations, updates, and flexibility in adapting to the new virtual setting. She acknowledged that they covered a lot of information and had very meaningful conversations. O'Corry-Crowe echoed Williams' comments and thanked everyone, especially Muto and Young, for their efforts. He also thanked Williams for doing such a great job chairing the meeting.

Muto requested that SRG members send additional comments to her within the next few weeks. She also noted that she will continue to post documents on the AK SRG VLab website and then will send a final document list to meeting attendees. Muto noted that it is too early to determine if the 2022 Alaska SRG meeting will be virtual or in person. Williams agreed that the exact timing will be determined later, but it will be sometime in late February to late March 2022. Muto also spotlighted the upcoming joint Alaska-Pacific SRG intersessional meeting to discuss humpback whale stocks. Bengtson thanked Williams and the entire SRG, stating that he appreciates the SRG's input to help keep MML on track.

The AK SRG then met in a closed session to develop their recommendations.

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